



Translation

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference PCT-1-151017	FOR FURTHER ACTION		See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/JP2003/013294	International filing date (day/month/year) 17 October 2003 (17.10.2003)	Priority date (day/month/year) 17 October 2002 (17.10.2002)	
International Patent Classification (IPC) or national classification and IPC C01B 3/38, 3/36			
Applicant TOYO RADIATOR CO., LTD.			

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 6 sheets, including this cover sheet.

This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 8 sheets.

3. This report contains indications relating to the following items:

- I  Basis of the report
- II  Priority
- III  Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV  Lack of unity of invention
- V  Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI  Certain documents cited
- VII  Certain defects in the international application
- VIII  Certain observations on the international application

Date of submission of the demand 17 October 2003 (17.10.2003)	Date of completion of this report 18 March 2004 (18.03.2004)
Name and mailing address of the IPEA/JP	Authorized officer
Facsimile No.	Telephone No.

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/JP2003/013294

## I. Basis of the report

## 1. With regard to the elements of the international application:\*

the international application as originally filed

the description:

pages 1-3, 5-8, 10-13, 15-30, as originally filed  
 pages \_\_\_\_\_, filed with the demand  
 pages 4, 4/1, 9, 14, 31, filed with the letter of 04 March 2004 (04.03.2004)

the claims:

pages 2-16, 18-22, 24, 25, as originally filed  
 pages \_\_\_\_\_, as amended (together with any statement under Article 19  
 pages \_\_\_\_\_, filed with the demand  
 pages 1, 17, 23, filed with the letter of 04 March 2004 (04.03.2004)

the drawings:

pages 1-5, as originally filed  
 pages \_\_\_\_\_, filed with the demand  
 pages \_\_\_\_\_, filed with the letter of \_\_\_\_\_

the sequence listing part of the description:

pages \_\_\_\_\_, as originally filed  
 pages \_\_\_\_\_, filed with the demand  
 pages \_\_\_\_\_, filed with the letter of \_\_\_\_\_

## 2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item. These elements were available or furnished to this Authority in the following language \_\_\_\_\_ which is:

the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).  
 the language of publication of the international application (under Rule 48.3(b)).  
 the language of the translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

## 3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

contained in the international application in written form.  
 filed together with the international application in computer readable form.  
 furnished subsequently to this Authority in written form.  
 furnished subsequently to this Authority in computer readable form.  
 The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.  
 The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4.  The amendments have resulted in the cancellation of:

the description, pages \_\_\_\_\_  
 the claims, Nos. \_\_\_\_\_  
 the drawings, sheets/fig \_\_\_\_\_

5.  This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).\*\*

\* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rule 70.16 and 70.17).

\*\* Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.

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International application No.  
PCT/JP 03/13294

## V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

## 1. Statement

Novelty (N)	Claims	1-25	YES
	Claims		NO
Inventive step (IS)	Claims	8, 11, 25	YES
	Claims	1-7, 9, 10, 12-24	NO
Industrial applicability (IA)	Claims	1-25	YES
	Claims		NO

## 2. Citations and explanations

## Documents

1. JP 6-84537 A (Osaka Gas Co., Ltd.), 25 March 1994
2. JP 8-138703 A (Osaka Gas Co., Ltd.), 31 May 1996
3. JP 2002-53306 A (Babcock-Hitachi KK), 19 February 2002
4. JP 2002-160904 A (Toyota Motor Corp.), 4 June 2002
5. JP 2001-192201 A (Nippon Chemical Plant Consultant Co., Ltd.), 17 July 2001
6. JP 2001-223017 A (Toyota Motor Corp.), 17 August 2001

## Explanations

Claims 1 and 2 (do not involve an inventive step)

Obtaining a gaseous mixture by suction and mixing in a steam reforming system is known, as disclosed in documents 1 and 2. Having a dedicated steam generating means instead of using steam produced in the generating component of a fuel cell so as to give a stable supply is simply a design feature.

Moreover, a person skilled in the art could easily consider and investigate the use of these features in an autoxidation internal heating type steam reforming system (known, as disclosed in document 3).

## Claim 3 (does not involve an inventive step)

In addition to the aforementioned features, means for decreasing carbon monoxide by oxidation are known and are indicated in documents 3 and 4.

## Claim 4-7 (does not involve an inventive step)

In addition to the aforementioned features, using the sensible heat of the reformed gas, fuel combustion off gas or steam by means of heat-exchange is conventional art.

## Claim 8

There is nothing in any document specifying that the heating medium in the autoxidation internal heating type steam reforming system is heated by excess steam as described here; and this feature cannot be considered to be obvious to a person skilled in the art.

## Claims 9 and 10 (do not involve an inventive step)

In addition to the aforementioned features, supplying reformed gas to a fuel cell and reusing the anode off gas are conventional practices and are obvious to a person skilled in the art.

## Claim 11

There is nothing in any document specifying the mode for reusing the anode off gas in an autoxidation internal heating type steam reforming system described here; and this feature cannot be considered to be obvious to a person skilled in the art.

## Claims 12-16 (do not involve an inventive step)

In addition to the aforementioned features, giving the reforming means a structure such as that described here is disclosed in document 5 and could be deduced

easily by a person skilled in the art.

Claims 17 and 18 (do not involve an inventive step)

Supplying the reformed gas to a fuel cell and reusing the anode off gas as gaseous starting material in a steam reforming system are known, as disclosed in documents 2, 4 and 6, and a person skilled in the art could easily consider and investigate the use of these features in an autoxidation internal heating type steam reforming system.

Claims 19 and 20 (do not involve an inventive step)

In addition to the aforementioned features, obtaining a gaseous mixture by suction and mixing is known, as also disclosed in documents 1 and 2, and a person skilled in the art could easily consider and investigate the use of this feature in a steam generating means.

Claims 21 and 22 (do not involve an inventive step)

Controlling the quantity of anode off gas supplied is known, as disclosed in document 4, and a person skilled in the art could easily consider and investigate the use of this feature in accordance with the changes in pressure of the generated steam.

Claims 23 and 24 (do not involve an inventive step)

Installing a heat exchange means in the shift catalyst layer in a steam reforming system is known, as disclosed in documents 3 and 5, and a person skilled in the art could easily consider and investigate the use of these features in an autoxidation internal heating type steam reforming system.

Claim 25

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There is nothing in any document specifying the mode for reusing the anode off gas described here in an autoxidation internal heating type steam reforming system; and this cannot be considered to be obvious to a person skilled in the art.